Journal of Research on the Lepidoptera 26(1-4):125-140, 1988

Apodemia palmerii (Lycaenidae: Riodininae): Misapplication of Names, Two New Subspecies and a New Allied Species

George T. Austin

Nevade State Museum and Historical Society, 700 Twin Lakes Drive, Las Vegas, Nevada 89107

Abstract. The subspecific names of *Apodemia palmerii, A. p. palmerii* and *A. p. marginalis*, have been variously used for the phenotypes of the species. Examination of the types and series of topotypes indicates that they are synonymous. New subspecific names are proposed for the darker phenotype distributed east of the Colorado River drainage and another in central Mexico. Southern Baja California, Mexico populations, often referred to as *Apodemia "palmerii"* are described here as a new species.

Introduction

William Henry Edwards (1870) described *Lemonias palmerii* from Utah. Subsequently, Skinner (1920) named the taxon *Lemonias palmerii marginalis* from a California population of the species. The name *"marginalis"* has been variously treated as a form synonymous with Edwards' concept (dos Passos 1964, Howe 1975, Miller and Brown 1981, Austin 1985b) or as a recognizable subspecies distinct from nominate *A. palmerii* (Comstock 1927, Holland 1931, Emmel and Emmel 1973, Tilden 1975, Austin and Austin 1980). Populations from southern Arizona and western New Mexico generally have been referred to as nominate *A. palmerii* (Comstock 1927, Holland 1974, Howe 1975, Ferris 1976). Study of material from throughout the range of the species and examination of the type specimens of the two presumptive subspecies indicate errors in the application of *A. p. marginalis* and that new names are needed for the *A. palmerii* populations east of the Colorado River drainage and those in Mexico. Yet another phenotype, previously referred to as *A. palmerii* (Rindge 1948, Holland 1972), occurs in southern Baja California, Mexico, but it is, in fact, an undescribed species.

Throughout this paper, butterfly size (given as mean and range) is the length of the right primary from the base to the apex in millimeters. Measurements are for 15 specimens unless otherwise indicated. Specimens indicated by "M" and "F" are male and female, respectively.

Names and Populations

The description of the male of *Apodemia palmerii* was based on Utah material taken by Edward Palmer (Edwards 1870). Later, Edwards (1884b) stated that his description was based on a single male. Brown (1967, 1968) presented ample evidence that the specimen was most likely collected in Utah, probably in the vicinity of St. George, Washington County during June 1870. The holotype male (Brown 1968) at the Carnegie Museum of Natural History is a typical spring brood specimen with entirely orange margins. Skinner's (1920) description of *A. p. marginalis* was based on two males and a female from Acme (once called Morrison, *ca.* 4 miles south of Tecopa), Inyo County, California. He distinguished it from supposed nominate *A. palmerii* by its orange wing margins (hence the name *"marginalis"*) and by its pallidity. No mention was made of either the geographical or seasonal source(s) of the material to which he compared his types. A male [holo]type and a female [allo]type are among the type material transferred to the Carnegie Museum of Natural History from the Academy of Natural Sciences of Philadelphia (see also Gillham and Ehrlich 1954). These were collected by Morgan Hebard on 8 August 1919 and represent the typical pale late summer phenotype.

I first became aware of a possible nomenclatural problem during my studies of southern Nevada butterflies (Austin and Austin 1980). My series from this area was of a seasonally variable, dark to pallid, orange-margined butterfly which was obviously distinct from the darker southern Arizona insect. It seemed unlikely on biogeographic and ecological bases that nearly all Colorado River basin populations were of one phenotype while southern Utah examples should be a disjunct population of the same sort as found in southern Arizona. I, therefore, collected representative series from eastern California near the type locality of *A. p. marginalis*, from southern Utah in the St. George region (the designated type locality of *A. palmerii*) and from southern Arizona (Pima, Cochise and Pinal counties). I also took a small number from western Arizona (Maricopa and Mohave counties). These along with material borrowed from various museums and collectors indicate that two phenotypes are indeed involved in this region but that the names available have been inappropriately applied.

The distribution of the species *Apodemia palmerii* includes extreme northeastern Baja California, Mexico; the southeastern, desert portions of California; southern Nevada; extreme southwestern Utah; south and eastward through southern Arizona and southwestern New Mexico to western Texas (Fig. 1). It occurs in northwestern and northcentral Mexico (where its distribution is incompletely known, Hoffmann 1976), but it occurs south into the central portions of the country (to Hidalgo and Michoacan) and in the western states of Sonora and Sinaloa. The southern Baja California populations also traditionally have been treated as this species.

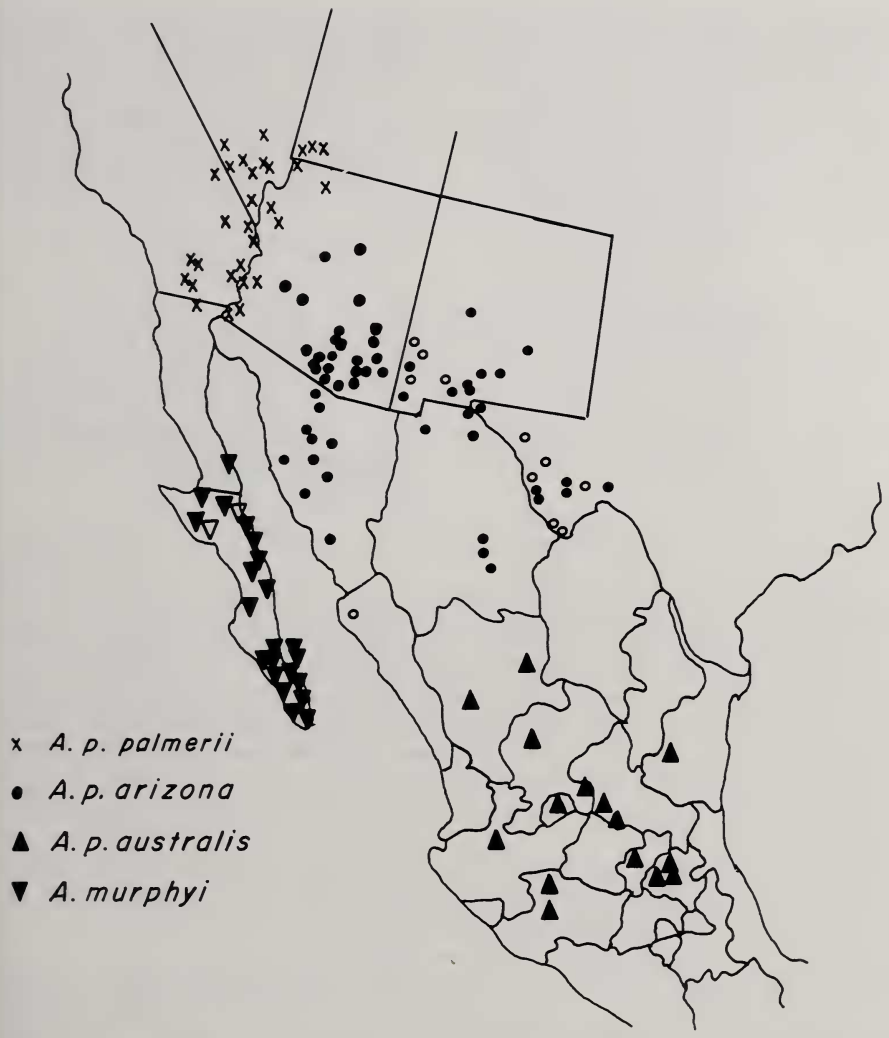


Fig. 1. Distribution of *Apodemia palmerii* sspp. and *Apodemia murphyi* (open symbols indicate specimens not examined).

A pale phenotype with prominant orange margins from the Colorado River drainage and nearby areas of California, Nevada, Utah and western Arizona generally has been referred to as *Apodemia palmerii marginalis*. The darker populations from east of the Colorado River drainage, on the other hand, have been considered nominate *A. palmerii*. No other names have been applied to other variations within the species. While Edwards' description must serve as that for the species, it is not detailed enough to distinguish that phenotype from others in question. Skinner's description unquestionably refers to the pale phenotype. The application of the name *"marginalis"* was, in my opinion,

probably based on comparisons with Arizona material since Arizona specimens are more widely represented in collections than those from southern Utah. My experience is that *A. palmerii* is uncommon in the St. George region, even where good stands of its foodplants, honey mesquite (*Prosopis glandulosa* Torr.) and screwbean mesquite (*P. pubescens* Benth.) are available. The species, however, is abundant in similar situations in southern Arizona.

Apodemia palmerii palmerii (W. H. Edwards, 1870) (Fig. 2)

Lemonias palmerii W. H. Edwards (1870, p. 195), Kirby (1871, p. 650), W. H. Edwards (1872, p. 38), W. H. Edwards (1874, p. 38), W. H. Edwards (1877, p. 38), Kirby (1877, p. 760), Strecker (1878, p. 104), Brooklyn Entomological Society (1881, p. 3), W. H. Edwards (1884a, p. 294), W. H. Edwards (1884b, p. 301), Maynard (1891, p. 126), Skinner (1898, p. 43), Smith (1903, p. 6), Snow (1907, p. 156)

Chrysobia palmerii Scudder (1876, p. 103)

Lemonias palmeri Holland (1898, p. 231), Skinner (1904, p. 16), Wright (1905, p. 202), Haskin (1914, p. 306)

Polystigma palmerii Dyar (1902, p. 34)

Apodemia palmerii Mengel (1905, p. 120), Stichel (1911, p. 288), Seitz (1924, p. 700), Barnes and Benjamin (1926, p. 16), Stichel (1930, p. 590), McDunnough (1938, p. 23), dos Passos (1964, p. 51), Brown (1967, p. 129), Scott (1979, p. 191), Fisher *in* Ferris and Brown (1981, p. 198–199), Miller and Brown (1981, p. 132), Pyle (1981, p. 530), Miller and Brown *in* Hodges (1983, p. 57)

Apodemia palmerii palmerii Stichel (1911, p. 288), Brown (1968, p. 121), Callaghan and Tidwell (1971, p. 198), Austin (1985a, p. 128), Austin (1985b, p. 107).

Apodemia palmeri Barnes and McDunnough (1917, p. 13), Holland (1931, p. 213), Ehrlich and Ehrlich (1961, p. 245), Tietz (1972, p. 504), Powell *in* Howe (1975, p. 270), Gillette (1983, p. 15).

Lemonias palmerii marginalis Skinner (1920, p. 175)

Apodemia palmerii from "marginalis" Barnes and Benjamin (1926, p. 16), McDunnough (1938, p. 23), Martin and Truxal (1955, p. 20), dos Passos (1964, p. 51), Hoffmann (1976, p. 68), Fisher *in* Ferris and Brown (1981, p. 198–199), Miller and Brown (1981, p. 132), Miller and Brown *in* Hodges (1983, p. 57)

Apodemia palmerii marginalis Comstock (1927, p. 151), Comstock and Dammers (1932, p. 37), Davenport and Dethier (1937, p. 170), Emmel and Emmel (1973, p. 49), Tilden (1975, p. 30)

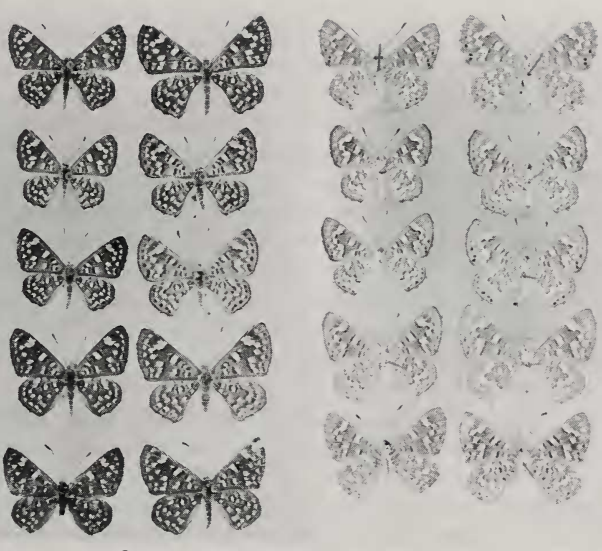
Apodemia marginalis Holland (1931, p. 213)

Apodemia palmeri marginalis Gillham and Ehrlich (1954, p. 102), Emmel (1972, p. 3), Austin and Austin (1980, p. 23)

Apodemia palmeri form "marginalis" Tietz (1972, p. 504), Powell *in* Howe (1975, p. 270)

Apodemia palmeri palmeri Austin and Austin (1980, p. 23)

Specimens of *Apodemia palmerii* from southwestern Utah, southern Nevada, southeastern California, extreme western Arizona and extreme northern Baja California Norte, Mexico (essentially the Colorado River and Death Valley



2a 2b

Fig. 2a. *Apodemia palmerii* subspecies (dorsal surface). Top left — *A. p. arizona* holotype male, AZ: Cochise Co.; Az. 90, 14.6 mi. N Az. 82, 4 Sept. 1980, *leg*. G. T. Austin. Top right — *A. p. arizona* allotype female, same data. Second left — *A. p. palmerii* topotype male of form "marginalis", CA: Inyo Co.; 0.3 mi. N Tecopa, 8 Sept. 1981, *leg*. G. T. Austin. Second right — *A. p. palmerii* topotype female of form "marginalis", same data. Third left — *A. p. palmerii* male of form "marginalis", NV: Clark Co.; Whitney Mesa at Sunset Rd., 6 Sept. 1977, *leg*. G. T. Austin, Third right — *A. p. palmerii* female of form "marginalis", NV: Clark Co.,; Las Vegas, Paradise Valley, 6 Sept. 1977, *leg*. G. T. Austin. Fourth left — *A. p. palmerii* male, NV: Clark Co.; Las Vegas, Paradise Valley, 24 May 1978, *leg*. G. T. Austin. Fourth right — *A. p. palmerii* female, same data. Bottom left — *A. p. australis* holotype male, MEXICO, Durango 1 mi. S. Nombre de Dios, 1760 m, 30 Aug. 1973, *leg*. L. D. and J. Y. Miller, Bottom right — *A. p. australis* allotype female, same data.

Fig. 2b. *Apodemia palmerii* subspecies (ventral surface). Same specimens as in Fig. 2a.

drainage basins, Fig. 1) are virtually identical in their general pallidity, in the presence of continuous orange margins on the dorsal surface of both wings, and in seasonal variability (Fig. 2). This geographical extent encompasses the type localities of both *A. p. palmerii* and *A. p. marginalis*. The latter name thus is clearly synonymous with the nominate and refers to the pale late summer/ autumn form. Examination of the types confirmed this. The butterfly is often locally abundant and flies in three to four broods in southern Nevada (Austin and Austin 1980) and two to three broods in southern California (Emmel and Emmel 1973).

Nominate *Apodemia palmerii* is seasonally variable. Early season (April-June) specimens are generally large (male $\bar{x} = 11.2$, range = 10.6–11.8,; female $\bar{x} = 12.5$, range = 11.7–13.1, May sample) and relatively dark with a restriction of the fulvous on the wing bases, especially on males. Later (July-October) specimens are smaller (male $\bar{x} = 10.1$, range 9.0–10.9; female $\bar{x} = 11.2$, range

10.2–12.2, September sample) and paler with considerable fulvous on the wings. The type specimen of *A. palmerii* was illustrated by Brown (1968). Holland (1931) figured a paratype of form "marginalis" but his indicated "type" of *A. palmerii* is a pseudotype (Brown 1968, see below). Emmel and Emmel (1973) illustrated a male of the spring phenotype. Holland (1931), Emmel and Emmel (1973) and Howe (1975) illustrated form "marginalis". Comstock and Dammers (1932) described and illustrated the life history of a California population. The larval host plants are *Prosopis glandulosa (= P. juliflora)* and *P. pubescens* (Fabaceae) (Comstock and Dammers 1932, Austin and Austin 1980).

This then leaves populations exhibiting somewhat darker phenotypes from outside this area without names. To rectify this situation, I describe here two new subspecies.

Apodemia palmerii arizona new subspecies **Austin** (Fig. 2)

Lemonias palmerii Kirby (1871, p. 650), Kirby (1877, p. 760), W. H. Edwards (1877, p. 38), W. H. Edwards (1883, p. 9), W. H. Edwards (1884a, p. 294), W. H. Edwards (1884b, p. 301), Maynard (1891, p. 126), Skinner (1898, p. 43), Smith (1903, p. 6), Snow (1904, p. 337), Snow (1907, p. 156)

Chrysobia palmerii Scudder (1876, p. 103)

Apodemia palmeri Edwards (1882, p. 28), Godman and Salvin (1886, p. 468), Barnes and McDunnough (1917, p. 13), Holland (1931, p. 213), Rindge (1948, p. 300), Ehrlich and Ehrlich (1961, p. 245), Powell *in* Howe (1975, p. 270), Austin (1978, p. 210)

Lemonias palmeri Godman and Salvin (1886, p. 468), Holland 1898, p. 231), Skinner (1904, p. 16), Haskin (1914, p. 306), Stone (1921, p. 114).

Polystigma palmerii Dyar (1902, p. 34)

Apodemia palmerii Mengel (1905, p. 120), Stichel (1911, p. 288), Seitz (1924, p. 700), Barnes and Benjamin (1926, p. 16), Stichel (1930, p. 590), McDunnough (1938, p. 23), Bauer (1954, p. 100), Martin and Truxal (1955, p. 20), dos Passos (1964, p. 51), Brown (1965, p. 112), Lewis (1973, p. 112), Tilden (1974, p. 24), Hoffmann (1976, p. 68), Fisher *in* Ferris and Brown (1981, p. 198–199), Miller and Brown (1981, p. 132), Pyle (1981, p. 530), Miller and Brown *in* Hodges (1983, p. 57), Austin (1985b, p. 107)

Apodemia palmerii palmerii Comstock (1927, p. 151), Brown (1968, p. 123), Holland (1974, p. 44), Ferris (1976, p. 46)

Apodemia palmeri palmeri Austin and Austin (1980, p. 23)

MALE. Dorsal ground color dark brown, sometimes nearly blackish-brown. Basal one-third of both wings usually fulvous, often with considerable black overscaling. White markings and their associated black outlines much as on *Apodemia palmerii palmerii*. Marginal area usually of ground color, especially apically, with small areas of fulvous in each cell (not broadly fulvous), these fulvous areas usually broader posteriorly on both wings and usually somewhat overscaled with ground color. Ventral ground color largely fulvous with markings of dorsum repeated but larger. Distinct submarginal black points on both wings.

Male genitalia virtually identical to those of *Apodemia palmerii palmerii*.

FEMALE. Somewhat larger in size than male with a more rounded (less pointed) apex to primaries. Color and pattern similar to male.

TYPES (data as on labels, clarified in brackets). Holotype male — A[RI]Z [ONA]: Cochise Co. [unty]; A[ri]z[ona State Route] 90, 10.8 mi. [les] N. [orth of]

A[ri]z[ona State Route] 82, 7 Sept.[ember] 1980, *leg.* G. T. Austin. Allotype female — same data as holotype. Paratypes (32M, 26F) — same data as holotype (26M, 21F); some data as holotype except 14.6 mi. N (6M, 4F); same data as holotype except 8.4 mi. N (1F).

DEPOSITION OF TYPE MATERIAL. The holotype, allotype, 11M and 6F paratypes will be deposited in the type collection of the Nevada State Museum. A pair of paratypes will be deposited in each of the following institutions: Allyn Museum of Entomology, American Museum of Natural History, National Museum of Natural History, Carnegie Museum of Natural History, Natural History Museum, San Diego, and Los Angeles County Museum. The remainder are to be retained by the author.

TYPE LOCALITY. ARIZONA: Cochise County, Arizona State Route 90, 10.8 miles north of Arizona State Route 82. The types were collected on the west side and within 100 feet of the road. Most were perched on mesquites (*Prosopis glandulosa*) (Fabaceae) which undoubtedly serves as the larval host plant.

DISTRIBUTION AND PHENOLOGY. *Apodemia palmerii arizona* occurs from Arizona south and eastward through southwestern New Mexico to western Texas, south into at least Chihuahua, Sonora and Sinaloa, Mexico (Fig. 1). The subspecies has at least two (but probably more) broods in southern Arizona (Austin 1978) and two broods in southwestern New Mexico (Ferris 1976). In southern Arizona, Brown (1965) reported it as a late rainy season species although Austin (1978) found it to occasionally have a large spring brood, at least in years with spring rainfall.

ETYMOLOGY. This subspecies is named for its type locality, the state of Arizona.

DIAGNOSIS AND DISCUSSION. The new taxon, *Apodemia palmerii arizona*, is at once distinguished from nominate *A. palmerii* by the largely dark margins of the dorsum of both the primaries and secondaries. This same area of *A. palmerii* is broadly fulvous with considerably less or no ground coloration. A very few *A. p. arizona* approach *A. p. palmerii* in this respect just as occasional *A. p. palmerii* have the margins somewhat darkened. The dorsal ground color of *A. p. arizona* is darker and with less fulvous flush basally than *A. p. palmerii* giving the impression of an overall darker butterfly. Some late season females of *A. p. palmerii* are very pale with the ground color approaching a pale tan (a condition I have not seen among *A. p. arizona*). The ventral color is paler than the average early season *A. p. palmerii* but somewhat darker than late season material. The submarginal black points are larger and more distinctly indicated than on nominate *A. palmerii*. An aberrant female from Patagonia, Arizona (5 Sept. 1951) has the postmedian and basal white markings absent on all wings; the submarginal markings are normal.

There is no appreciable seasonal variation in *Apodemia palmerii arizona* and late season specimens have the size (male $\bar{x}$ = 11.5, range = 10.6–12.0; female $\bar{x}$ = 12.4, range = 11.6–13.2, September sample) and a comparable dark ground color of early season *A. p. palmerii*. The figures in Howe (1975) adequately illustrate *A. p. arizona*. Edwards (1884b) and Holland (1931, as the type of *A. p. palmerii*) also illustrate this taxon. Edwards (1884b) described and illustrated the egg and young larva from southern Arizona.

Apodemia palmerii arizona, at least, applies to southern Arizona, southern New Mexico and adjacent northwestern Mexico populations (Fig. 1). The few specimens I have seen from the extreme eastern portion of its distribution in

Texas (but not near El Paso) and east central Chinhuahua (but not northwestern) consistently have broader white markings and are somewhat larger (female $\bar{x} = 13.2$, range = 12.4–14.3, N = 7) but otherwise closely fit the concept.

Material from central Mexico is yet darker dorsally and browner ventrally. It is recognized as follows:

Apodemia palmerii australis new subspecies **Austin** (Fig. 2)

Apodemia palmeri Godman and Salvin (1887, p. 709), Holland (1931, p. 213), Ehrlich and Ehrlich (1961, p. 245), Powell *in* Howe (1975, p. 270)

Lemonias palmeri Holland (1898, p. 231)

Lemonias palmerii Skinner (1898, p. 43)

Apodemia palmerii Seitz (1924, p. 700), Fisher *in* Ferris and Brown (1981, p. 198–199), Pyle (1981, p. 530)

MALE. Dorsal ground color blackish with slight fulvous basal overscaling on secondaries and occasionally on primaries, white markings as on other *Apodemia palmerii* subspecies but often smaller in size. Outer margins with fulvous indistinct, usually restricted to small area at anal angle of primaries and posterior half of secondaries. Ventrum dull brownish-orange ground color, apex of primaries and entire secondaries dark tan, markings of dorsum repeated, black submarginal points minute.

Genitalia of typical *Apodemia palmerii* type with broadly rounded uncus, hooked upper process of valve, distinctly rounded vinculum and relatively short saccus.

FEMALE. Wings more rounded than male, color and pattern similar on both surfaces, ventral black submarginal points larger.

TYPES. (data as on labels, clarified in brackets). Holotype male — MEXICO: Durango; 1 mi[le] S[outh] Nombre de Dios, 1760 m[eters elevation], desert scrub, 30 viii [August] 1973, *leg.* L. D. & J. Y. Miller, Sta. No. 1973–53. Allotype female — same data as holotype. Paratypes (all MEXICO: Durango; 43M, 20F) — same data as holotype (37M, 7F, AME); 1.5 mi. SW Durango, 1920 m, ground scrub, 28 Aug. 1973, (5M, 5F, AME); Durango, 6200′, 13 Aug. 1947 (1M, 5F, AMNH); Durango, 1 Aug. 1964 (1F, CIS); Yerbanis, Cuencame Dist., 19 Aug. 1947 (1F, AMNH); Nombre de Dios, 5900′, 13 Aug. 1947 (1F, AMNH).

DEPOSITION OF TYPE MATERIAL. The holotype, allotype, 41M and 11F paratypes are deposited at the Allyn Museum of Entomology; 1M and 7F paratypes are at the American Museum of Natural History; 1F paratype is at the California Insect Survey; and one pair of paratypes are retained by the author.

TYPE LOCALITY. MEXICO: Durango; 1 mile south of Nombre de Dios, 1760 meters. The vegetation here is desert scrub with trees to 25 feet in height, some mesquites (*Prosopis*), various other low trees with a grass undergrowth on a valley floor (*fide* L. D. Miller).

DISTRIBUTION AND PHENOLOGY. This subspecies occurs mostly in the central mountains of Mexico from Durango to Hidalgo and Michoacan usually above 4500′ in elevation (Fig. 1). There are at least two broods with records in April (once), May (once) and from mid July through mid September, most records are for August.

ETYMOLOGY. This phenotype is the most southerly distributed of the species, thus the name *"australis"* (= southern).

DIAGNOSIS AND DISCUSSION. This is a very dark *Apodemia palmerii* subspecies, appearing nearly black when fresh. Individuals are considerably darker above than those from other known populations of the species and lack a conspicuous basal flush of fulvous. The white spots average small and sometimes appear smudged. Ventrally this butterfly is brown rather than distinctly fulvous as are both of the more northern subspecies. The basic pattern, wing shape and the structure of the male genitalia leave no doubt that this subspecies falls within the range of variation expected of *A. palmerii*. It approximates the size of other *A. palmerii* (male $\bar{x} = 11.5$, range = 10.6–12.5; female $\bar{x} = 12.6$, range = 11.3–13.2).

An even more distinctive series of populations occurs in the southern portions of Baja California, Mexico. This heretofore has been called *Apodemia palmerii* but closer examination reveals that this is a very different insect with a unique combination of characters. This new species is here described as:

Apodemia murphyi new species **Austin** (Fig. 3)

Apodemia palmeri Rindge (1948, p. 300), Powell *in* Howe (1975, p. 270)

Apodemia palmerii Holland (1972, p. 156), Fisher *in* Ferris and Brown (1981, p. 198–199), Pyle (1981, p. 530)

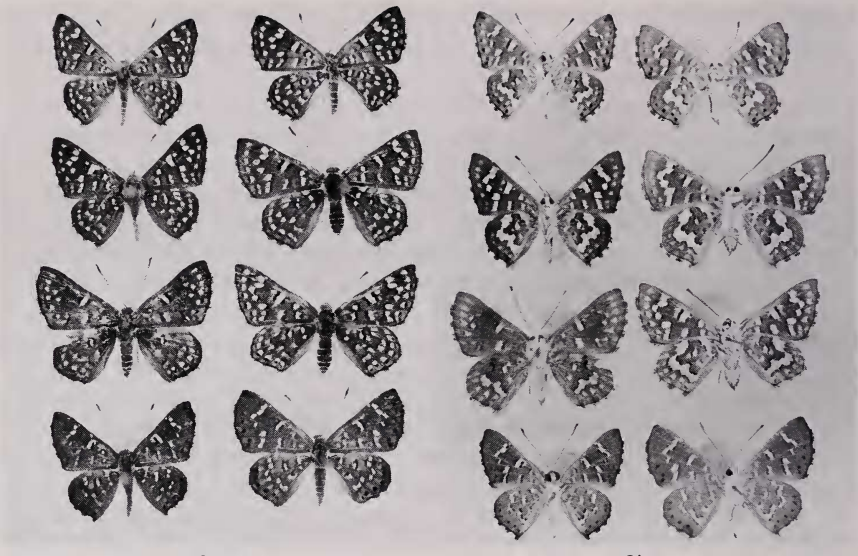
MALE. Dorsum with blackish-brown ground color. Late summer and fall (July-mid November) specimens usually with well-defined fulvous basal area; winter and spring (late November–April) specimens heavily overscaled with ground color on this area, often black without fulvous. White markings as on *Apodemia palmerii palmerii* and *A. p. arizona* but considerably reduced in size, especially on primaries. Marginal area mostly of ground color except for, usually, posterior one or two cells on each wing, these with small areas of fulvous.

Ventral ground color brownish-orange, markings of primaries repeat dorsal pattern but tending slightly larger. Ventral secondaries with white markings considerably larger than dorsally, those in postmedian area form a continuous broad band. Wings narrow, apex of primaries very long and pointed, often approaching subfalcate.

Genitalia similar to *Apodemia palmerii* but with several subtle differences as discussed below.

FEMALE. Similar to male except dorsal white markings larger and more fulvous marginally, especially posteriorly on secondaries. Shape of primaries more rounded than on males but with distinctive tendency towards a subfalcate tip. Seasonal variation similar to male.

TYPES. Holotype male — MEXICO: Baja California Sur; Arroyo San Bartolo, 28 Aug. 1982, *leg.* [J. W.] Brown and [D. K.] Faulkner (SDNHM). Allotype female — same data as holotype (SDNHM). Paratypes (all MEXICO: Baja California Sur; 103M, 54F) — same data as holotype (2M, 1F, SDNHM); A. San Bartolo, 3 Nov. 1961 (2M, CM), 12 Nov. 1961 (2M, 1F, CM); San Bartolo, 3 Oct. 1981 (2M, 1F, SDNHM); 2 mi. S of Buena Vista, 30 Nov. 1979 (3M, 1F, SDNHM); Buena Vista at Monument Rd., 4 Jan. 1980 (1F, JB); 3 mi. S Rio Buenavista, 25 Oct. 1961 (2M, CM); 5 km S Rio Buenavista, 25 Oct., 1961 (2M, CM); 4.2 mi. W. Miraflores, 30 Sept. 1981 (1M, SDNHM); Miraflores, 25 Oct. 1961 (1M, CM), beach, Todos Santos, 26 July 1981 (6M, SDNHM); estuary at Todos Santos, 26 July 1981 (9M, 2F, CM), 31 July 1981 (2M, CM), 20 March 1974 (4M, 1F, CM); El Pescadero, 20 March 1974 (1F, CM); 1/4 mi W Todos Santos, 20 March 1974 (2M, SDNHM), 19–20 March 1974 (3M, GF); 14 mi N Todos Santos, 4 Oct. 1981 (1M, 1F, SDNHM); Santiago, 6 Nov. 1946 (1M, 3F, SDNHM); 19 mi. SE El Cien,



3a 3b

Fig. 3a. *Apodemia murphyi* and *Apodemia hepburni* (dorsal surface). Upper left — *A. murphyi* holotype male, MEXICO: Baja California Sur; Arroyo San Bartolo, 28 Aug. 1982, *leg*. Brown and Faulkner. Upper right — *A. murphyi* allotype female, same data. Second left — *A. murphyi* male dark phenotype, MEXICO: Baja California Sur; 12.2 mi. SE San Perdito near Rancho Saucito, 8 Oct. 1981, *leg*. F. Andrews and D. Faulkner. Second right — *A. murphyi* female dark phenotype, MEXICO: Baja California Sur; 7 mi. SE Guerrero Negro, 8 Apr. 1976, *leg*. Doyen and Rude. Third left — *A. murphyi* aberrant female, MEXICO: Baja California Sur, 10 mi. N Bahia Asuncion, 25–27 April 1984, *leg*. Bloomfield. Third right — *A. murphyi* normal female, same data. Bottom left — *A. hepburni* male, MEXICO: Baja California Sur; 2 mi. SW Cadauno, 26 Aug. 1982, *leg*. Faulkner and Brown. Bottom right — *A. hepburni* female, same data.

Fig. 3b. *Apodemia murphyi* and *Apodemia hepburni* (ventral surface). Same specimens as in Fig. 4a.

27 Sept. 1981 (1M, 1F, SDNHM); Cabo Pulmo, 4 Nov. 1946 (1M, SDNHM); 1.5 mi. SW San Jose del Cabo, 30 Sept. 1981 (3M, SDNHM); San Jose del Cabo, 17 Feb. 1940 (4M, SDNHM), 1 July 1968 (1M, CM), 22 Nov. 1961 (1F, CM); 3 mi. N San Jose del Cabo, 22–23 Nov. 1961 (2M, 5F, CM); Cabo San Lucas, Hotel Finisterra, 8–10 Oct. 1979 (1M, 1F, SDNHM); Cabo San Lucas, 22 March 1939 (1F, AMNH), no date (1M, AMNH), 2 Apr. 1949 (1M, SDNHM), 23 Nov. 1961 (1M, CM); 20 mi. N Cabo San Lucas, 29 Sept. 1970 (1F, CM); 15 mi. S La Paz, 1 Nov. 1946 (5M, 2F, SDNHM); La Paz airport, 10 Oct. 1979 (1F, SDNHM); 7 mi. SW La Paz, 4 Aug. 1966 (1F, SDNHM); La Paz, 17–22 Sept. 1967 (1M, SDNHM), 9 July 1968 (2F, CM); 13 Sept. 1959 (1M, CM); La Paz, Guaycura Hotel grounds, 6–8 Nov. 1961 (5M, 1F, CM); SE shore La Paz Harbor, 5 Nov. 1961 (1M, CM), 10 Nov. 1961 (5M, CM); E shore, La Paz Bay, 8 Nov. 1961 (6M, 8F, CM); 3 mi. S Santiago, 25 Oct., 1961 (1F, CM); Las Barracas, *ca*. 30 km E Santiago, 7/12 Apr. 1982 (1M, CIS); Puerto Chileno, 22 Nov. 1961 (1M, CM); Boca de la Sierra, 17–24 Nov. 1961 (1M, 2F, CM); Ro. Palmarito, 27 Oct.–5 Nov.

1961 (2M, 2F, CM); Rancho El Salto, 28 Oct. 1961 (1M, CM); Bahia de Palmes, 20 Nov. 1961 (2F, CM); Isla Espiritu Santo, 19–23 Feb. 1936 (1F, SDNHM), 17 April 1958 (1M, LACM), 14 July 1985 (1M, SDNHM), 30 Dec., 1938 (3M, 3F, AMNH); San Jose I., Gulf of California, 5 March 1975 (1F, UCD); Isla Partida, 17 April 1958 (1M, LACM); Bahia Agua Verde, 20 April 1958 (2M, LACM); 31 km N Todos Santos, 29 Nov. 1980 (1F, SDNHM); 7 km S Candauno [sic], 26 Aug. 1982 (2F, SDNHM); Punta Conejo, *ca.* 32 km SW El Cien, 9 Jan. 1977 (1M, G. T. Austin); Todos Santos Rd., *ca.* 42 km N Cabo San Lucas, 14 Jan. 1977 (1M, G. T. Austin); Muertos Bay, 24 March 1939 (1M, AMNH), 29 Dec., 1938 (1M, AMNH).

DEPOSITION OF TYPE MATERIAL. The holotype, allotype, 36M and 17F paratypes are deposited at the Natural History Museum, San Diego; 51M and 31F paratypes are in the Carnegie Museum of Natural History; 6M and 4F paratypes are in the American Museum of Natural History; 4M paratypes are in the Los Angeles County Museum; 1M paratype is in the collection of the California Insect Survey; 1F paratype is at the Bohart Museum, University of California, Davis; 1F paratype is in the private collection of J. Brock; 3M paratypes are in the private collection of G. S. Forbes; and 2M paratypes are in the author's private collection.

TYPE LOCALITY. MEXICO: Baja California Sur; Arroyo San Bartolo. San Bartolo is on Mexico Highway 1 between La Paz and San Jose del Cabo. All specimens examined from south of 25°N latitude are designated paratypes.

DISTRIBUTION AND PHENOLOGY. *Apodemia murphyi* occurs throughout much of Baja California Sur and to extreme southern Baja California Norte, Mexico (Fig. 1). Its northern limit appears to be the Bahia de las Animas and Bahia de Los Angeles area on the east coast (Rindge 1948, Holland 1972). No records of an *Apodemia palmerii*-like butterfly exist north of this point (Rindge 1948, Powell 1958, Patterson and Powell 1959, Holland 1972) for nearly 450 km virtually to the United States border (one specimen of *A. p. palmerii* from Mexicali, Baja California Norte, AME) although Hoffmann (1976) indicated that *A. p.* "marginalis" is found in Baja California.

The insect is apparently continuously brooded and has been collected in every month. The majority of specimens (127 of 250 examined with dates) are from October, November and December. This may reflect collecting patterns rather than phenological patterns of the butterfly. Fresh specimens occur throughout the year.

ETYMOLOGY. I name this insect after Dennis D. Murphy to whom I owe numerous debts.

DIAGNOSIS AND DISCUSSION. The taxon *Apodemia murphyi* is most distinctive. It is about the size of *Apodemia palmerii* but the sexes are nearly the same (male $\bar{x}$ = 11.7, range = 10.4–13.2; female $\bar{x}$ = 11.6, range = 10.8–12.7, October sample). The basic pattern above is similar to *A. palmerii arizona* but the white spots are smaller in size (but are distinct and not smudged as on some specimens of *A. p. australis*). The ventral pattern is very different from any *A. palmerii*, especially the secondaries with the broad (up to *ca.* 25% of wing surface) and continuous white postmedian band. On *A. palmerii* this band is disjunct and more of a sinuous series of spots. The shape of the primaries is different from any *A. palmerii* being more drawn out and pointed towards the apex, especially on the male, and subfalcate. The fulvous basal area of the wings is sharply set off from the dark distal area, particularly on summer and fall specimens. These areas grade into one another on *A. palmerii*.

An interesting aberrant female was seen (MEXICO: Baja California Sur; 10 mi. N Bahia Asuncion, 25–27 April 1984, *leg.* Bloomfield, SDNHM; Fig. 3). Most of the postmedian white spots of the dorsum are absent. Those present along with the basal white spots are small. These are similar on the ventral primaries and the typical postmedian of the secondaries is absent anteriorly and narrowed posteriorly. The black submarginal macules and the black lines associated with the postmedian are nearly obsolete. This is not as extreme as the aberrant *A. p. arizona* noted above. Aberrations are rare among the Riodininae with none described for the North American fauna (Kendall and McGuire 1984).

The male genitalia, while similar to those of *Apodemia palmerii*, differ in several respects (note above that genitalia of *A. palmerii* are constant over the entire range of the species). Overall, the structures are slightly more massive although the aedeagus is proportionally shorter, terminating just beyond the lower arm of the valve (extends considerably further posteriorly on *A. palmerii*). The uncus is relatively narrow (dorsal aspect) and rounded (posterior aspect). The uncus of *A. palmerii* is broader with more rounded lobes and flatter. The falces are stouter on *A. murphyi*, the dorsal arm averages slightly longer and the ventral arm is considerably shorter than on *A. palmerii* (dorsal arm: ventral arm = 0.7 for *A. murphyi*, 0.5 for *A. palmerii*). The valves of *A. murphyi* are broader and stouter with a pointed (but not hooked) upper process. The saccus is proportionally longer on *A. murphyi* and the vinculum is straighter and not broadly rounded ventrally as on *A. palmerii*.

Apodemia murphyi resembles *Apodemia hepburni* Godman and Salvin in wing shape and the continuous postmedian band on the ventral secondaries (Fig. 3). The latter is otherwise distinctive with a less complete spot pattern (lacking the submarginal series among others), no clear basal fulvous area on the dorsal primaries and a considerably narrower postmedian band on the ventral secondaries. The figures show these characters clearly. *Apodemia hepburni* is sympatric and synchronic with *A. murphyi* at many localities from Mulege southward. *Apodemia hepburni* records extend from 26 August through 6 April; *A. murphyi* from 26 July through 8 April at these localities. Label data (also *fide* J. W. Brown) indicates that *A. murphyi* nectars commonly on *Bebbia juncae* (Asteraceae) and also on *Melochia tomentosa* (Sterculiaceae) and *Baccharis* sp. (Asteraceae). The species is associated with *Prosopis glandulosa* (Fabaceae) throughout its range; this probably is a larval host plant.

Acknowledgements. I thank several curators and others for loans of specimens from and/or space to work at their respective museums: L. D. and J. Y. Miller, Allyn Museum of Entomology, Sarasota, Florida (AME); F. H. Rindge, American Museum of Natural History, New York (AMNH); D. K. Faulkner, Natural History Museum, San Diego, California (SDNHM); J. P. Donahue, Los Angeles County Museum, Los Angeles, California (LACM); R. K. Robbins, National Museum of Natural History, Washington, D. C. (USNM); J. E. Rawlins and C. W. Young, Carnegie Museum of Natural History, Pittsburgh, Pennsylvania (CM); J. A. Powell, California Insect Survey, Berkeley, California (CIS); R. Schuster, Bohart Museum, University of California, Davis (UCD); T. W. Davies, California Academy of Sciences (CAS); and G. Harjes, Nevada State Museum, Carson City, Nevada. I gratefully acknowledge the loan of specimens from the private collections of J. Brock, Tucson, Arizona (JB); G. S. Forbes, Las Cruces, New Mexico (FG); E. V. Gage, San Antonio, Texas; R. W. Holland,

Albuquerque, New Mexico; C. S. Lawson, Las Vegas, Nevada; S. McKown, Boulder City, Nevada; D. Mullins, Tucson, Arizona; P. J. and S. Savage, St. George, Utah; M. Smith, Las Vegas, Nevada; and S. Spomer, Lincoln, Nebraska. L.D. Miller called my attention to the *Apodemia palmerii australis* phenotype and provided habitat information. R. O. Kendall commented on Texas records. J. W. Brown was helpful in providing information about *Apodemia murphyi* and on Baja California in general and D. D. Murphy read manuscript drafts and offered helpful suggestions. The manuscript was also improved from suggestions from R. H. T. Mattoni and an anonymous reviewer.

Literature Cited

AUSTIN, G. T. 1978. Phenology and diversity of a butterfly population in southern Arizona. J. Lepid. Soc. 32:207–220.

AUSTIN, G. T. 1985a. Lowland riparian butterflies of the Great Basin and associated areas. J. Res. Lepid. 24:117–131.

AUSTIN, G. T. 1985b. Nevada butterflies: preliminary checklist and distribution. J. Lepid. Soc. 39:95–118.

AUSTIN, G. T. & A. T. AUSTIN. 1980. Butterflies of Clark County, Nevada. J. Res. Lepid. 19:1–63.

BARNES, W. & F. H. BENJAMIN. 1926. Check list of the diurnal Lepidoptera of boreal America. Bull. So. Calif. Acad. Sci. 25:3–27.

BARNES, W. & J. McDUNNOUGH. 1917. Check list of the Lepidoptera of boreal America. Herald Press, Decatur, IL.

BAUER, D. L. 1954. A survey of the butterflies of the Verde Valley. Plateau, Mus. No. Ariz. 26:95–102.

BROOKLYN ENTOMOLOGICAL SOCIETY. 1881. [Checklist of North American Macrolepidoptera]. Brooklyn Ent. Soc. 4 (suppl.):1–25.

BROWN, F. M. 1967. Dr. Edward Palmer's collecting localities in southern Utah and northwestern Arizona. J. Lepid. Soc. 21:129–134.

BROWN, F. M. 1968. The types of riodinid butterflies described by William Henry Edwards. Trans. Am. Ent. Soc. 94:111–136.

BROWN, K. S. 1965. Some comments on Arizona butterflies (Papilionoidae). J. Lepid. Soc. 19:107–115.

CALLAGHAN, C. J. & K. B. TIDWELL. 1971. A checklist of Utah butterflies and skippers. J. Res. Lepid. 10:191–202.

COMSTOCK, J. A. 1927. Butterflies of California. Publ. by the author, Los Angeles, CA.

COMSTOCK, J. A. & C. M. DAMMERS. 1932. Metamorphoses of five California diurnals (Lepidoptera). Bull. So. Calif. Acad. Sci. 31:33–45.

DAVENPORT, D. & V. G. DETHIER. 1937. Bibilography of the described life-histories of the Rhopalocera of America north of Mexico. 1889–1937. Ent. Americana 17:155–194.

dos PASSOS, C.F. 1964. A synonymic list of the Nearctic Rhopalocera. Lepid. Soc. Mem., no. 1.

DYAR, F. G. 1902. A list of North American Lepidoptera and key to the literature of this order of insects. Bull. U. S. Nat. Mus., no. 52.

EDWARDS, W. H. 1870. Descriptions of new North American diurnal Lepidoptera. Trans. Am. Ent. Soc. 3:189–196.

EDWARDS, W. H. 1872. Synopsis of North American butterflies. Am. Ent. Soc., Philadelphia, PA.

EDWARDS, W. H. 1874. Synopsis of North American butterflies. Hurd & Houghton, New York, NY.

EDWARDS, W. H. 1877. Catalogue of the Lepidoptera of America north of Mexico, part I diurnals. Am. Ent. Soc., Philadelphia, PA.

EDWARDS, W. H. 1882. List of species of butterflies taken in Arizona by Jacob Doll, 1881. Papilio 2: 28–29.

EDWARDS, W. H. 1883. List of species of butterflies collected in Arizona by Mr. H. K. Morrison, in 1882. Papilio 3:9–10.

EDWARDS, W. H. 1884a. Revised catalogue of the diurnal Lepidoptera of America north of Mexico. Trans. Am. Ent. Soc. 11:245–337.

EDWARDS, W. H. 1884b. The butterflies of North America. Second Series. Houghton, Mifflin & Co., Boston, MA.

EHRLICH, P. R. & A. H. EHRLICH. 1961. How to know the butterflies. W. C. Brown Co., Dubuque, IA.

EMMEL, T. C. 1972. A preliminary check list of the butterflies of southern California. Mid-Cont. Lepid. Series, no. 55.

EMMEL, T. C. & J. F. EMMEL. 1973. The butterflies of southern California. Nat. Hist. Mus., Los Angeles Co., Sci. Series 26.

FERRIS, C. D. & F. M. BROWN. 1981. Butterflies of the Rocky Mountain states. Univ. Oklahoma Press, Norman, OK.

FERRIS, C. D. 1976. A checklist of the butterflies of Grant County, New Mexico and vicinity. J. Lepid. Soc. 30:39–49.

FREEMAN, H. A. (coordinator). 1981. 1980 season summary. Zone 4: Saskatchewan, Manitoba, N. & S. Dakota, Nebraska, Kansas, Oklahoma, Texas. News Lepid. Soc. 1981:20.

GILLETTE, C. F. 1983. A species level synoptic checklist of 143 Utah butterflies. Utahensis 3:14–18.

GILLHAM, N. W. & P. R. EHRLICH. 1954. The butterfly types of Henry Skinner and coauthors in the Academy of Natural Sciences of Philadelphia (Lepidoptera: Papilionoidea and Hesperioidea). Trans. Am. Ent. Soc. 80:91–117.

GOODMAN, F. D. & O. SALVIN. 1879–1901 [1886]. Biologia Centrali-Americana. Lepidoptera: Rhopalocera. vol. 1. London.

GOODMAN, F. D. & O. SALVIN. 1887–1901 [1887]. Biologia Centrali-Americana. Lepidoptera: Rhopalocera. vol. 2. London.

HASKIN, J. R. 1914. Butterfly collecting in Mojave County, Arizona. Ent. News 25:300–308.

HODGES, R. W (et al. eds.). 1983. Check list of the Lepidoptera of America north of Mexico. E. W. Classey Ltd., London.

HOFFMANN, C. C. 1976. Catalogo sistematico y zoogeografico de los Lepidopteros Mexicanos. Sociedad Mexicana de Lepidopterologia, A. C., publ. esp. 1.

HOLLAND, R. 1972. Butterflies of middle and southern Baja California. J. Res. Lepid. 11:147–160.

HOLLAND, R. 1974. Butterflies of six central New Mexico mountains, with notes on *Callophrys (Sandia) macfarlandi* (Lycaenidae). J. Lepid. Soc. 28:38-52.

HOLLAND, W. J. 1898. The butterfly book. Doubleday and McClure, NY, NY.

HOLLAND, W. J. 1931. The butterfly book. Revised edition. Doubleday, Doran and Co., Garden City, N.Y.

HOWE, W.H. 1975. The butterflies of North America. Doubleday, Garden City, NY.

KENDALL, R. O. & W. W. McGUIRE. 1984. Some new and rare records of Lepidoptera

found in Texas. Bull. Allyn Mus., no. 86.
KIRBY, W. F. 1871. A synonymic catalogue of diurnal Lepidoptera. John van Voorst, London.
KIRBY, W. F. 1877. A synonymic catalogue of diurnal Lepidoptera. Supplement March 1871-June 1877. John van Voorst, London.
LEWIS, H. L. 1973. Butterflies of the world. Follett Publ. Co., Chicago, IL.
McDUNNOUGH, J. 1938. Check list of the Lepidoptera of Canada and the United States of America. Part 1. Mem. So. Calif. Acad. Sci. 1:1-275.
MARTIN, L. M. & S. F. TRUXAL. 1955. A list of North American Lepidoptera in the Los Angeles County Museum. Part 1. Butterflies (suborder Rhopalocera). Los Angeles Co. Mus. Sci. Series, no. 18, zool., no. 8.
MAYNARD, C. J. 1891. A manual of North American butterflies. DeWolfe, Fiske & Co., Boston, MA.
MENGEL, L. W. 1905. A catalogue of the Erycinidae. Reading, PA.
MILLER, L. D. & F. M. BROWN. 1981. A catalogue/checklist of the butterflies of America north of Mexico. Lepid. Soc. Med., no. 2.
PATTERSON, D. & J. A. POWELL. 1959. Lepidoptera collecting in the Sierra San Pedro Martir, Baja California. J. Lepid. Soc. 13:229-235.
POWELL, J. A. 1958. Additions to the knowledge of the butterfly fauna of Baja California Norte. Lepid. News 12:26-32.
PYLE, R. M. 1981. The Audubon Society field guide to North American butterflies. A. A. Knopf, New York, NY.
RINDGE, F. H. 1948. Contributions toward a knowledge of the insect fauna of Lower California. No. 8, Lepidoptera: Rhopalocera. Proc. Calif. Acad. Sci. 24:289-312.
SCOTT, J. A. 1979. Hibernal diapause of North American Papilionoidea and Hesperioidea. J. Res. Lepid. 18:171-200.
SCUDDER, S. H. 1876. Synonymic list of the butterflies of North America, north of Mexico. Part II, Rurales. Bull. Buffalo Soc. Nat. Hist. 3:98-129.
SEITZ, A. 1924. The Macrolepidoptera of the world. vol. 5. The American Rhopalocera. Alfred Kernan Verleg, Stuttgart.
SKINNER, H. 1898. A synonymic catalogue of the North American Rhopalocera. Am. Ent. Soc., Philadelphia, PA.
SKINNER, H. 1904. A synonymic catalogue of the North American Rhopalocera. suppl. no. 1. Am. Ent. Soc., Philadelphia, PA.
SKINNER, H. 1920. A new variety of *Lemonias* (Lepidoptera). Ent. News 31:175.
SMITH, J. B. 1903. Check list of the Lepidoptera of boreal America. Am. Ent. Soc., Philadelphia, PA.
SNOW, F. H. 1904. Lists of Coleoptera, Lepidoptera, Diptera and Hemiptera collected in Arizona by the Entomological expeditions of the University of Kansas in 1902 and 1903. Kansas Univ. Sci. Bull. 2:323-350.
SNOW, F. H. 1907. Results of the Entomological collecting expedition to Pima County, Arizona, in June and July, 1906. Trans. Kansas Acad. Sci. 20:140-164.
STICHEL, H. 1911. Lepidoptera, Rhopalocera. Family Riodinidae. *In* P. Wytsman (ed.), Genera Insectorum. P. Wytsman, Brussels.
STICHEL, H. 1930. Lepidopterorum catalogus. Riodinidae III: Riodininae II. W. Junk, Berlin.
STONE, W. 1921. Butterflies of the Chircahua Mountains, Arizona (Lepid., Rhop.). Ent. News 32:112-115.

STRECKER, H. 1878. Butterflies and moths of North America . . . with full bibliography. B. F. Owen, Reading, PA.

TIETZ, H. M. 1972. An index to the described life histories, early stages and hosts of the Macrolepidoptera of the continental United States and Canada. Allyn Mus. Ent., Sarasota, FL.

TILDEN, J. W. 1974. Unusual and interesting butterfly records from Texas. J. Lepid. Soc. 28:22-25.

TILDEN, J. W. 1975. An analysis of the W. G. Wright butterfly and skipper plesiotypes in the collection of the California Academy of Sciences. Occ. Pap. Calif. Acad Sci., no. 118.

WRIGHT, W. G. 1905. The butterflies of the west coast of the United States. Wittaker & Ray Co., San Francisco, CA.

SPECIMENS EXAMINED

Apodemia palmerii palmerii

UNITED STATES: Arizona (37M, 23F; 27 March-7 September): Coconino, Mohave, Yuma counties; CALIFORNIA (321M, 206F; 15 March-12 November): Imperial, Inyo, Riverside, San Bernardino, San Diego counties; NEVADA (211M, 126F; 17 April-13 October): Clark, Lincoln, Nye counties; UTAH (43M, 29F; 20 May-13 September): Washington County. **MEXICO:** BAJA CALIFORNIA NORTE (1F; August).

Apodemia palmerii arizona

UNITED STATES: ARIZONA (type series plus 407M, 335F; 17 April-24 October): Cochise, Coconino, Gila, Graham, Maricopa, Pima, Pinal, Santa Cruz, Yavapai counties; NEW MEXICO (19M, 15F; 12 May-11 September): Dona Ana, Hidalgo, Lincoln, Luna, Otero, Socorro counties; TEXAS (8M, 25F; 13 April-9 September): Brewster, El Paso, Presidio, Terrell counties. **MEXICO**: CHIHUAHUA (2M, 6F; 14 July-31 August); SINALOA (1M, 1F; 28 June); SONORA (35M, 31F; 12 March, 3 August-25 October).

Apodemia palmerii australis

MEXICO: AGUASCALIENTES (1M; 27 August); DURANGO (type series plus 16M, 1F; 30 July-20 August); HIDALGO (4M, 9F; 30 April, May, 19 July-8 August); JALISCO (1M, 26 July); MICHOACAN (15M, 3F; 9 August); QUERETARO (2F; 20 July); SAN LUIS POTOSI (5M, 5F; 20 July-23 August); TAMAULIPAS (4M; 20 September); ZACATAS (1M, 1F; 30 August).

Apodemia murphyi

MEXICO: BAJA CALIFORNIA NORTE (1M, 3F; 30 March, 19 September-6 October); BAJA CALIFORNIA SUR (type series plus 80M, 33F; 7 March-28 June, 11 August-December including 5M at AME and 1M, 1F at SDNHM labeled Baja California Norte).

OTHER RECORDS

Apodemia palmerii

UNITED STATES: NEW MEXICO; Catron, Grant counties (Ferris 1976); TEXAS: (31 March-7 October; Tilden 1974, Freeman 1981): Culberson, Jeff Davis, Pecos counties (Tilden 1974, *fide* R. O. Kendall).

Apodemia murphyi

MEXICO: BAJA CALIFORNIA NORTE (8 May; Rindge 1948).